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## Mathematics teacher educators' beliefs about assessment

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### Abstract

The aim of this study is to focus on and attract attention at mathematics teacher educators' beliefs about assessment and to contribute to suffice the need in this field. In the study, interviews taking average 60 minutes were carried out with 5 academicians from KTU Fatih Faculty of Education in spring term of 2006-2007 educational years. In the interviews, a semi-structured interview form designed by researcher (corresponding author) and a survey devised by Katung et al. (1999) and adapted into Turkish by Şenocak (2006) were used. By using Magolda's (1992) Epistemological Reflection Model, the data obtained were analyzed descriptively in a qualitative manner. It was found that the ideas put forward by the participants were satisfactory and promising concerning philosophical notion of the new mathematics curriculum or reform efforts on mathematics education in Turkey.

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### 1. Introduction

Researchers agree that beliefs are major factors affecting teachers' way of teaching and changing their practice of teaching. In understanding teachers' thoughts, practices and changes in practices; beliefs have been major concepts that researchers have focus on. At the present day, it is accepted that researches into teachers' beliefs can inform educational practice in ways that prevailing research agendas have not and cannot. This view is based on the assumption that beliefs are the best indicators of the decisions individuals make throughout their lives, or more specifically, teachers' beliefs affect their planning, decision-making, and subsequent classroom behaviour (Irez, 2007). On the other hand; assessment, one of the most important concepts in learning and teaching, is a decision process that collects, records, interprets and exploits students' views so that it has a supplementary role (Harlen, Gipps, Broadfoot & Nuttall, 1992; Sullivan, 1997; Taras, 2005). Generally, to explore student's knowledge diagnostic, formative and summative assessments are used by teachers, however, whereas summative assessment is in a harmony with a traditional instruction, diagnostic one is compatible with alternative teaching methods that incorporates in student's pre-existing knowledge. Further, formative assessment is now a piece of constructivist

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teaching that focus on ‘learning process’ rather than ‘learning product’ (Ayas, Çepni, Johnson & Turgut, 1997; URL-1, 2006; URL-2, 2006; Taras, 2005). In Turkey, Ministry of National Education suggests that the assessment activities should be done in order to find out the weaknesses of students and to fulfill them (Duban & Küçükylmaz, 2008). As Marshall and Drummond (2006) stated that teachers enact Assessment for Learning (AfL) practices in their classroom and built it on an underlying pedagogic principle. But being lack of pedagogical knowledge and limited in service courses prevented teachers from being qualified. Besides teachers were not given enough information and resources about how to make assessment or which materials should be used and assessment method is given to teacher’s initiative. Furthermore, common use of traditional measurement and assessment methods prevents finding out students’ skills and their developmental potentials. Turkish teachers usually try to do their assessment activities through Bloom’s theory of school learning which exists in teaching programs and as stated just now disadvantage of this approach is that it ignores the students’ different skills and developmental potentials in assessment. Thus as parallel to recent developments in education, contemporary approaches such as constructivism and multiple intelligences become dominant in new teaching programs in Turkey (Birgin & Baki, 2007). There have been plenty of studies about the beliefs of mathematics teachers and candidate teachers. These studies mainly concentrate on the relations between teacher beliefs and teaching approaches (Thompson, 1984; Ernest, 1989) and classification of the beliefs and changes in these beliefs (Wilson & Cooney, 2002; Franke, Fennema & Carpenter, 1997; Hart, 2002). Still there have been few studies on classification of mathematics teacher educators’ beliefs about learning and teaching or particularly assessment. Besides, that the education faculties are charged with mainstream teacher education and training escalades the importance of teacher trainer and academicians’ beliefs about learning and teaching. This makes these beliefs be worth studying. On the other hand, with the framework of the rearrangements on the Turkish education system, teacher educators’ present beliefs about assessment should be examined in detail because teacher educators’ ideas have not been taken seriously and not been included in the decision making although they are one of the most important keystones of the education process. One another factor hindering application of the rearrangements is that the concepts of ‘learning’, ‘teaching’ and ‘teacher training’ have not been fully understood by teacher trainers and teachers. In Turkey case to implement new curricula efficiently, it is essential to examine mathematics educators’ present beliefs which are base for their conventional mathematics teaching approaches thoroughly.

## 2. Methodology

Case study method was applied in this study; we aim to focus on and attract attention at the beliefs of mathematics teachers’ educators, one of the most important groups in the mathematics educators, and to contribute to suffice the need in this field. Research question is:

“How can be characterized the mathematics teacher educators’ beliefs about assessment?”

The study was conducted with 5 academicians in spring term of 2006 - 2007 educational years in KTU Fatih Faculty of Education. The participants were selected among 28 academicians who were surveyed with the questionnaire devised by Katung et al. (1999) and adapted into Turkish by Şenocak (2006). These five were volunteer and willing to share their ideas about assessment. Each of the informants completed the one-hour interview designed to elicit responses relating to their beliefs about assessment. So, it was collected the bulk of data during one interview lasting average 60 minutes with each of participants.

By using Baxter Magolda’s (1992) Epistemological Reflection Model, the data obtained were analyzed descriptively in a qualitative manner. The model was used as a theoretical framework to label and to present the results more clearly.

By concerning the model; the participants perceiving assessment as students’ reproduction of the teacher-bound knowledge (without examining it is true or not) and giving it back to the teacher (mostly by tests, which have questions with single clear - cut answers rather than open long questions) were classified as absolute level. Participants interpreting assessment based on students’ understanding (mostly by open – ended questions, which allow students to show how much he /she know) rather than just the acquisition of information or getting a particular right answer were classified as transitional level. Participants who value assessment: a). Based on independent thinking (that is; instead of getting a particular or a right answer like tests which have questions with multiple choice rather exams which have open questions giving students to have room to show his/her own thinking, considering the quality of student’s comments about subject or how student submit and justify his/her ideas about it or whether student could make his/her ideas strong with evidences etc.), b). As a mutual process between student and teacher (a

process allowing student to define his/her own learning goals and producing feedback to the both about student improvement) were classified as independent level. Finally; participants who appreciate assessment as: a). A process in which student and teacher work together toward goal and measure progress, b). A process that accurately measures competence in the context were classified as contextual level.

### 3. Results and Interpretations

*Lindsey(at the contextual level): “ ...My management class, which was a group project, should have been graded on how well you worked within a group and how well you contributed and how you finally came up with a solution. The tests for that class weren’t exactly very representative, I didn’t think, of what the class itself was trying to teach you. The final didn’t math with what the whole course was trying to emphasize (Magolda, 1992; p.184 ).*

#### 1<sup>st</sup> Participant

*“Summative assessment, at the end of the term and ranking students is out of date. This way of assessment only monitors student’s present situation and also prevent students from compensate and remedy their weaknesses. The term has already gone and your time has flown anyway. A teacher should support student development by interfering instantly in process. For this purpose alternative assessment tools should be used. Dynamic assessment is the state of two elements being firmly attached; instruction and assessment. In this type, teacher is active and monitors himself with feedbacks given by students, improves his/her instruction methods and techniques. If assessment is only perceived as fear or punishment, students also take fear, anxiety or reward concepts as priority whereas in-process assessment increases student motivation and achievement. Assessment only with tests and at the end of the term is not sufficient for determining student skills, knowledge and how much they have improved. This is just taking a glimpse of that moment, not even let student produce anything.”*

The participant is considered as at conceptual level (like Lindsey was) in terms of assessment because participant was observed as appreciating the significance of the dynamic assessment, the process assessment in which instruction and assessment always go together. At the same time we observe that the participant also articulates that the proper alternative assessment, for determining student development and making students perform the related skills conveniently, is necessary. Additionally, he remarked that assessment process provides feedback for both students and teachers. In short the participant mentioned three fundamental perceptions of the conceptual level related to assessment:

1. Being process-bound and towards determining the progress,
2. Assessing competences properly,
3. Providing feedback for both student and teacher.

#### 2<sup>nd</sup> Participant

*“It is wrong to label student as successful or unsuccessful. Alternative assessment methods should be applied. This is a student-rights friendly system. We assess the process. We can interfere instantly without waiting the end. We can support student improvement by determining student mistakes and weaknesses instantly. Assessment shouldn’t be separated from instruction. ...Students already evaluate teacher anyway. The gain of teachers is checking themselves asking ‘Am I competent?’, ‘What are my weaknesses?’ and by this way changing the style or improve themselves.”*

The participant is thought as at the beginning of conceptual level. It was observed that this participant did not give as detailed explanations as the 1<sup>st</sup> participant had done. Additionally, this participant did not mentioned about assessing skills properly (the second fundamental perception of the conceptual knowing presented above). Instead, it is seen that participant emphasizes on the process assessment in which instruction and assessment always go together. This may be a result of not having detailed knowledge about assessment.

### 3<sup>rd</sup> Participant

*“Not only result but also process should be assessed. Otherwise declare that the ones getting lower marks are unsuccessful and the ones with high marks are successful. In this case one student may say that “I have been studying but I could not do well in the exam, I get excited”. Of course, the student might say the truth. So, the ability of student should be evaluated in the learning process, for example in a project work..... Getting feedback from student depend on teachers’ attitude towards student. In my opinion, teacher should be open to be criticized...when I was student teacher and taught mathematics in school experience courses I said to students write their opinions about me, about my teaching style, about my positive and negative aspect etc. I handed out papers and picked them. Up to now I have hidden those papers, because student sometimes do not dare to say his/her opinions about you. However; I believe that teacher assess, students rather criticize generally because assessment is a high rank activity.”*

The ideas of the participant imply that he may be at the beginning of the conceptual level (like second participant). Because it was observed that he mentioned about process assessment, about ability of student and getting feedback from student. However, he did not provide detailed explanation about assessment and he did not define process assessment thoroughly. In addition, saying that “teacher assess, students rather criticize generally because assessment is a high rank activity” have traces of some absolute level perceptions such as; taking the teacher as the unique authority in the classroom, accepting assessment as a method giving only feedbacks to students and overemphasizing the achievement.

### 4<sup>th</sup> Participant

*“We should conduct assessment to continuously monitor individual development in process with the framework of our goals.... For example, if a very successful student gets sick near the end of the term, will we let him fail? No. ....The feedback given to students is important. Explaining how to study may render student more successful than telling students to work hard. Why?, because if you give feedback in process students have opportunity to correct themselves..... The feedbacks should be given not only students having weaknesses, but also to successful students. Why?, To motivate successful student better and to push him improve more.”*

The ideas put forward by the participant shows that he is at the beginning of independent level because he, on one hand talked about process assessment but he, on the other hand, accepts assessment as a method giving only feedbacks to students and overemphasize on the achievement. In addition; the participant said nothing about students’ independent thinking skills that should be considered. Moreover; saying that ““We should conduct assessment to continuously monitor individual development in process with the framework of our goals” have traces of some absolute level perceptions such as; taking the teacher as the unique authority in the classroom.

Jim (at the independent level): *“The professor is up there saying, “I have got an opinion; the book has got an opinion; and you have got an opinion. And yours is just as good as the two opinions that I have said before...” (Magolda, 1992; p. 152).*

### 5<sup>th</sup> Participant

*“Exams ask for rote learning and memorizing. However if questions facilitating interpretation asked, most probably active students would also be successful. Alternative assessment tools should be implemented. The achievement of some students may be increased with alternative assessment..... Actually a teacher can not miss a student because the teacher continuously instructs the student, asks questions and receives feedback from the student. This can help the student to achieve. This can also contribute the teacher’s development. I heard one teacher said: “I managed owing to my students.”...And teachers absolutely must be overt to improvement. He/she should not ignore by saying: “Just a student critics!” He/she should consider and evaluate all student critics.”*

The participant was believed to be at the independent knowing level because he emphasized on independent thinking and interpreting and also that assessment is a process for both students and teachers (provides feedback for both), which are two important perceptions of the independent thinking level in terms of assessment. Participant did not mention to the issue of “measuring skills for assessment”, which is a perception about assessment for conceptual knowing level. This is a clue of that he may not be at that level.

The five participants above were found at contextual level by concerning the questionnaire. In addition; it was found that among the rest 23 academicians, who questionnaire was applied to, 15 were also found at contextual level, 5 were found at transitional level and 3 were found at absolute level.

#### 4. Conclusions and Suggestions

Concerning obtained data; it can be said that the participants' beliefs about assessment fairly comply with the philosophical notion of the Turkish brand-new mathematics curriculum. Knowing that education faculties are mainly charged with teacher training and finding participants' beliefs about assessment at high level (independent and contextual) is hopeful. However, we believe that by conducting similar studies with larger samples and by using multiple intellectual development models, such as Perry's (1970); Belenky et al. (1986) or social groups defined by Ernest(1991), in analyzing data, it might be possible to get additional perspectives on and contribute to teacher training researches. As Pegg and Panizzon (2008) emphasized, assessment for learning requires educators to consider the alignment among assessment, curriculum, and pedagogy carefully.

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